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# The Use and Abuse of Parities in Comparisons of Specific Volumes: Some Case Studies

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**The use and abuse of parities in comparisons of specific volumes; Some case studies**

Data based on international price comparisons have played and continue to play a role in policy debates in some countries, most notably the United Kingdom. The quality and sophistication of approaches have varied over time and between sectors.

The paper compares the use made of ICP I and ICP II results a generation ago with more recent approaches. It makes suggestions as to how applications can be improved in future.

**Case One; Health Care Costs and Volumes in the 1970s**

The writer was told some years ago by the person who had been Chief Economist at the then Department of Health and Social Security that a study of comparative costs and volumes had been undertaken after the change of government in May 1979. The study had included France, Germany and the United States. The writer's impression was and is that the study had relied on the specific data on volume and costs published in 1978[1] (this is supported by the fact that the same person, after retirement, used data from the same source for a different study[2] (which contained a wider range of countries; among them Belgium, Italy, Japan and the Netherlands).

Research undertaken by the writer at the National Archives at Kew has not yet found the original study. However it appears practicable to reconstruct it from what is known already about the access to data enjoyed and the methodology employed at the time.

The 1978 ICP report presents expenditures per head in two ways; in national currency and in "international dollars". It should be noted that while national accounts of the time treated medical care differently if it was provided free by the public sector rather than bought by individuals; the ICP made no such distinction. The figure in "international dollars" constitutes a volume measure and reflects a purchasing power parity *specific to the category of expenditure* (whether medical care or bread and cereals). Estimates are available for both 1970 and 1973. It is not certain how many countries were looked at in the study of comparative costs and volumes after May 1979. It seems unlikely that all sixteen countries covered by ICPI and II would have been included in the original study because of considerations of policy relevance (the original sixteen comprised Belgium, Colombia, France, Germany, Hungary, India, Iran, Italy, Japan, Kenya, Korea, Malaysia, the Netherlands, the Philippines, the United Kingdom and the United States). It is known that eight of the countries appeared in a different study undertaken by the same individual. However a much later piece of work[3] undertaken by the Department of Health included excluded two of the eight, presumably on grounds of lack of comparability or relevance; it included in addition four countries (Australia, Canada, New Zealand and Sweden) that had joined the International Comparison Programme much later.

Table A below covers estimates for 1970 for the six countries most likely to have been included in the original study. It represents a best guess since the individual who undertook it is no longer available to be contacted.

**Table A: Expenditure per head on medical care 1970**

| Country | Own currency expenditure | Exchange Rate | Nominal Dollars | International Dollars |
|---|---|---|---|---|
| France | 953.99 | 5.5289 | 172.5 | 212.0 |
| Germany | 588.19 | 3.6465 | 161.3 | 186.7 |
| Japan | 29620 | 358.15 | 82.7 | 209.1 |
| Netherlands | 414.04 | 3.6166 | 114.4 | 170.5 |
| United Kingdom | 37.806 | 0.4174 | 90.6 | 138.1 |
| United States | 316.67 | 1.0 | 316.7 | 175.6 |

The furthest right column represents the volume of expenditure per head on medical care in 1970. The one next to it shows its value in United States dollars at the official exchange rate.

Table B shows a similar calculation for 1973.

**Table B: Expenditure per head on medical care 1973**

| Country | Own currency expenditure | Exchange Rate | Nominal Dollars | International Dollars |
|---|---|---|---|---|
| France | 1421.56 | 4.454 | 319.2 | 309.1 |
| Germany | 908.91 | 2.6725 | 340.1 | 236.3 |
| Japan | 44561 | 272..19 | 163.7 | 311.4 |
| Netherlands | 690.48 | 2.7956 | 207.0 | 223.5 |
| United Kingdom | 54.284 | 0.4078 | 133.1 | 186.3 |
| United States | 433.93 | 1.0 | 433.9 | 253.9 |

Tables C and D show levels of costs/prices and volume of expenditure per head relative to the United Kingdom in 1970 and 1973 respectively.

**Table C: Cost/price level and volume of expenditure on medical care in 1970 (United Kingdom=100)**

| Country | Cost/price level | Volume |
|---|---|---|
| France | 124 | 153 |
| Germany | 131 | 135 |
| Japan | 60 | 151 |
| Netherlands | 102 | 123 |
| United States | 275 | 127 |

**Table D: Cost/price level and volume of expenditure on medical care in 1973 (United Kingdom=100)**

| Country | Cost/price level | Volume |
|---|---|---|
| France | 144 | 165 |
| Germany | 201 | 126 |
| Japan | 74 | 167 |
| Netherlands | 154 | 120 |
| United States | 239 | 136 |

Although it was clear that the volume of expenditure on health was less in the United Kingdom than in likely comparators, it was clear also that, except in the case of Japan, cost/price levels were significantly higher. It seems likely that the cost implications of adopting a different model of health care finance were regarded as more important than any possible volume effects by policy makers at the time.

**Case Two: Health Care Volumes in the late 1990s**

Late in 2001, estimates of comparative volumes of expenditure per head on health care were included in a report commissioned by the United Kingdom government (referred in endnote 3). These were based on figures published by OECD for 1998. Table E below shows them.

**Table E: Expenditure per head on health care in 1998 – US Dollars at General Purchasing Parity**

| Country | Expenditure on Health |
|---|---|
| Australia | 2,085 |
| Canada | 2,360 |
| France | 2,034 |
| Germany | 2,361 |
| Japan | 1,795 |
| Netherlands | 2,150 |
| New Zealand | 1,440 |
| Sweden | 1,732 |
| United Kingdom | 1,510 |
| United States | 4,165 |

They were used to demonstrate that the United Kingdom spent significantly less per head on health care than any comparable country other than New Zealand. Such a finding accorded with the commitment of policy makers to increase expenditure very substantially.

An interesting question is whether the methodology used a couple of decades earlier would have supported policy as strongly.

Data based on specific parities were not and are not available on an annual basis. However, they can be derived from (or even found in) the triennial benchmark results produced by the OECD. These are available for 1999[4] (but not 1998) and 2002 and, in a slightly different form, for 2005

Table F shows three different estimates of real health care expenditure in 1999. One column replicates the estimates in Table E (but using OECD Dollars for the general purchasing power parity) and the other two use Elteto-Koves-Szulc (EKS) and Geary-Khamis (GK) specific parities.

**Table F: Health Care Expenditure Per Head in 1999; three alternative measures of volume (expressed in OECD Dollars)**

| Country | EKS specific Parity | GK specific Parity | General Parity |
|---|---|---|---|
| Australia | 2,177 | 1,904 | 1,790 |
| Canada | 2,234 | 1,766 | 1,836 |
| France | 2,425 | 1,958 | 1,900 |
| Germany | 2,159 | 1,903 | 1,751 |
| Japan | 2,399 | 2,130 | 1,732 |
| Netherlands | 2,265 | 1,984 | 1,468 |
| New Zealand | 1,583 | 1,285 | 1,388 |
| Sweden | 1,757 | 1,531 | 1,699 |
| United Kingdom | 1,936 | 1,489 | 1,519 |
| United States | 2,906 | 3,005 | 3,906 |

The use of general parities for a different year (1999 rather than 1998) has a limited effect on rankings (principally on the Netherlands relative to the United Kingdom). Both sets of specific parities have the effect of compressing the range of volumes – more in the case of EKS than GK (in the opposite direction from what might be expected – suggesting that health care expenditure is not subject to any kind of Gerschenkron effect). One comparator country (Sweden) moves either close to the United Kingdom (on GK) or well below it (on EKS). Both the narrower range and the position could have been expected to weaken the official case for increases in the volume of expenditure on health in the United Kingdom. As in the 1970s, the United Kingdom would have been found to have a lower cost/price level in its healthcare system than most other comparable countries. It is not clear how welcome such findings would have been to policy makers at the time (extrapolating from what is now known about attitudes towards evidence in other areas of policy – such as defence and security – may not be particularly reliable; however the experience of the writer in dealings at the time with policy-makers in a separate area of health policy was consistent with evidence being driven by policy requirements rather than the other way round).

Table G shows the result of a similar exercise for 2002. Data[5] for this would have become publicly available in 2004 and in principle could have been used to review the progress of the officially announced policy of seeking to match volumes of expenditure in comparable countries.

**Table G: Health Care Expenditure Per Head in 2002; three alternative measures of volume (expressed in OECD Dollars)**

| Country | EKS specific Parity | GK specific Parity | General Parity |
|---|---|---|---|
| Australia | 3,013 | 2,442 | 2,100 |
| Canada | 2,539 | 1,725 | 2,112 |
| France | 3,350 | 2,318 | 2,202 |
| Germany | 2,588 | 2,097 | 2,055 |
| Japan | 2,863 | 2,334 | 1,984 |
| Netherlands | 2,615 | 2,223 | 1,712 |
| New Zealand | 2,201 | 1,598 | 1,326 |
| Sweden | 2,655 | 1,669 | 1,903 |
| United Kingdom | 2,607 | 1,672 | 1,806 |
| United States | 3,121 | 3,426 | 4,557 |

On an EKS basis the volume of expenditure per head on health in the United Kingdom was close to those in Canada, Germany, the Netherlands and Sweden; effectively the perceived gap that drove policy in 2000 and 2001 had disappeared in most cases in 2002. The gap remains in most cases on a GK basis. To the extent that EKS is preferred as the method for specific comparisons (as seems to be the current conventional wisdom) it would appear that part of the rationale for expanding the volume of expenditure per head on health care in the United Kingdom in the 2000s may have lost its validity soon after the policy was adopted (in 2000).

**Case Three: Expenditure in Tertiary Education**

In 2003, the writer encountered at a conference in Cambridge a paper[6] applying a very similar approach to that of Derek Wanless to higher education spending (using general parities to measure volumes). It differed in that it did not represent official government policy but the views of an influential and respected economic commentator. Policy conclusions were drawn from it; much stronger ones than in the case of health expenditure. Specifically, these were that the United Kingdom university sector required an approximately doubling of funding per student in order to match its competitors (most notably the United States) and that this should be achieved by attracting funding from the private sector. The first half of the policy recommendations rendered it particularly difficult for there to be any critical analysis of the statistical basis undertaken from within the academic community in the United Kingdom. The writer felt in consequence that there was an analytical vacuum that needed to be filled by someone without institutional affiliation. He responded by conducting his own analysis using appropriate specific purchasing power parities for 1999 and 2002 (these were for education as a whole – since published sources did not contain ones for tertiary education alone.

Table H below shows expenditure per student in 1998 in nineteen countries measured using general purchasing power parities.

**Table H: Volume of Expenditure per Student in Tertiary Education 1998**

| Country | US Dollars using whole economy parity |
|---|---|
| Australia | 11,539 |
| Austria | 11,279 |
| Belgium | 7,226 |
| Canada | 14,579 |
| Denmark | 9,562 |
| Finland | 7,327 |
| France | 7,226 |
| Germany | 9,481 |
| Greece | 4,157 |
| Ireland | 8,522 |
| Italy | 6,295 |
| Japan | 9,871 |
| Netherlands | 10,757 |
| Norway | 10,918 |
| Spain | 5,038 |
| Sweden | 11,539 |
| Switzerland | 16,563 |
| United Kingdom | 9,699 |
| United States | 19,802 |

Expenditure per student in the United Kingdom (and large continental European countries such as France, Germany, Italy and Spain) was a half or less the level in the United States when measured using a general purchasing power parity; the same applied to Japan. Six countries had a somewhat higher level than this (again measured using a general purchasing power parity); these are Australia, Austria, Canada, Netherlands, Norway, Sweden and Switzerland (this last comes a good second to the United States).

Table I below shows the results of the exercise undertaken by the writer for 2002. In order to match the coverage by country in the previous table, the figures include expenditure on research and development as well as teaching; the alternative would have been to lose some interesting countries – among them, Switzerland The specific purchasing power parities used were those for expenditure on education as a whole. Using them represents a second-best method as against specific "higher education parities"; however no such parities appeared to be available. The choice was thus between using the economy-wide parity (which had led to strong conclusions for 1998) and using a proxy for costs/prices in tertiary education at least as a cross check. The view was taken that it was more important –and useful – to be approximately right than precise but seriously misleading.

**Table I: Expenditure per student on tertiary education 2002 – three alternative volume measures – all figures OECD Dollars**

| Country | EKS Specific Parity | GK Specific Parity | General Parity |
|---|---|---|---|
| Australia | 15,062 | 16,125 | 12,416 |
| Austria | 14,544 | 11,969 | 12,448 |
| Belgium | 14,436 | 12,391 | 12,019 |
| Canada | 18,861 | 18,011 | 19,992 |
| Denmark | 18,100 | 16,152 | 15,183 |
| Finland | 14,220 | 11,651 | 11,760 |
| France | 13,590 | 12,205 | 9,276 |
| Germany | 11,104 | 8,333 | 10,999 |
| Greece | 7,824 | 6,663 | 4,731 |
| Ireland | 12,718 | 8,758 | 9,809 |
| Italy | 11,020 | 9,286 | 8,636 |
| Japan | 12,419 | 10,555 | 11,216 |
| Netherlands | 17,445 | 15,413 | 13,101 |
| Norway | 16,722 | 14,723 | 13,739 |
| Spain | 11,895 | 10,416 | 8,020 |
| Sweden | 20,363 | 16,542 | 15,215 |
| Switzerland | 25,617 | 19,928 | 23,714 |
| United Kingdom | 13,525 | 11,705 | 11,822 |
| United States | 12,521 | 10,813 | 20,543 |

The principal effect of switching to specific parities appears to be to alter the volume level and ranking of the United States. Expenditure on tertiary education per student in the United States measured on this basis appears to be similar to that in other large countries such as France, Japan, Spain and the United Kingdom although significantly higher than in Germany and Italy. Some countries with small or sparse populations appear to spend very much more per student. Among these are Australia, Canada, Denmark, the Netherlands, Norway, Sweden and Switzerland.

The writer has shared some of these findings with regard to tertiary education with officials in the United Kingdom, He does not yet know how far they have influenced policy or will do so.

**Conclusions**

The three cases show that international comparisons of specific volumes will be called in aid in policy discussions (certainly in the United Kingdom and most likely elsewhere). This is no bad thing in itself. However, there is bound to be a risk of bad practice or even abuse of process,

It is clear from the latter two cases that applying a general purchasing power parity to calculate relative volumes can produce significant distortions which can in turn affect policy-making. It may well be that the United Kingdom expanded expenditure on

health care more rapidly in the decade after 2000 than would have been the case if volumes had been compared using specific parities.

It may be unrealistic to expect policy makers to demand comparative data only for benchmark years. If so, there needs to be some convention established as to how such data can be interpolated so that specific and appropriate converters for costs/prices can be applied. This is perhaps a promising area for further work.

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[2] "Labour Productivity in 1980: an international comparison" A.D. Roy , National Institute Economic Review No. 101, August 1982

[3] "Securing our Future Health: Taking a Long Term View" Derek Wanless, November 2001

[4] "Purchasing Power Parities and Real Expenditures 1999 Benchmark Year" OECD 2002

[5] "Purchasing Power Parities and Real Expenditures 2002 Benchmark Year" OECD 2004

[6] "How to save the British Universities" Martin Wolf 26th September 2002